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ABSTRACT

Two introductory biology courses which are given as service courses for agriculture students have been broken down into small conceptual units (mini-courses). Students cannot fail the course and are awarded a C grade when they have reached a predetermined level of mastery in each level for any unit, they may revise the unit and retake the test. If students do not complete the requirements, they are not given a grade or recorded as a fail. To obtain grades of A or B students elect to do extra reading and take a test measuring higher cognitive levels than knowledge. The mini-courses are taught using an audio-tutorial technique. (AL)

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A-T AND THE MINICOURSE CONCEPT

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Many innovations have been made in biology teaching in recent years. The purpose of most of these innovations has been to improve teaching, which hopefully results in greater learning. Many of the new techniques, however, do not consider the student's role in the learning process. This year at Purdue, in introductory botany and zoology, an attempt is being made to include the above educational goals. The introductory courses are being taught in small conceptual units or courses called minicourses. The minicourses allow for the versatility of introducing concepts which are common to both courses as well as to permit the concepts unique to plants or animals to be taught in separate minicourses. Combining the minicourse approach with the flexibility of audio-tutorial teaching allows the student more freedom in selecting a schedule which is compatible with his interest and his self-determined achievement level.

Biology 108 and 109 are service courses which are taught primarily for students in the School of Agriculture. The desire of the senior instructors was simply to teach biology to their students using the best system available. They attempted to

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devise a plan which would allow students who come with varying backgrounds and interests an opportunity to achieve a certain level of mastery of basic biological information and to recognize the principle concepts and techniques common to the biological sciences. They also wanted to devise the most flexible program pursuant to their objectives that was deemed possible within the current university setting.

The Plan

1. Students are told they cannot fail the course (Bloom, 1968), and furthermore, when they complete it, they will receive at least a C, since there is no D or F grade in the course. Students may not complete the course, but the instructors will not assign a grade of "fail".
2. Subject matter considered essential in a biology course is divided into "minicourses" which are typically shorter than the usual "one week A-T lesson." These minicourses are complete A-T units which include all the pertinent material appropriate to a given principle or concept, and the learning time may range from one-half hour to three hours depending on the minicourse topic and the student.
3. Principles or concepts common to both the plant and animal kingdoms are taught in "common" minicourses. Material pertaining specifically to the plant or to the animal world appears in "plant" or "animal" minicourses. Further, there are "optional" minicourses which students may chose for enrichment, but are not necessarily required.

4. Each minicourse is given a unit value which indicates the estimated study time required in the learning center by the average student. By the time a student has completed both 108 and 109 (which most School of Agriculture options require), they will have completed all the common, the plant and the animal minicourses, and ten units of the optional minicourses. Flexible scheduling allows a student to enter either course either semester, and he may complete only one course if that is all his program requires.
5. A student enrolled in either 108 or 109 may elect to take some or all of the minicourses for the companion course during his initial enrollment. Credit for satisfactorily completing these minicourses will be "banked" for use during his later enrollment in the companion course.

The Program

1. The program operates under the same general scheme reported by Postlethwait, et al. (1969). That is, a General Assembly Session (GAS), an Independent Study Session (ISS) and an Intregrated Quiz Session (IQS) constitute the basic format. The major differences lie in the nature of the ISS and the IQS. In the ISS, students now study in terms of minicourses and attempt to satisfy the behavioral objectives for these smaller minicourse units.

   In the IQS, students do not receive numerical or letter grades on either the oral or the written quiz. At the completion of the oral quiz, students are informed whether

they responded satisfactorily or unsatisfactorily on the specific minicourses scheduled for IQS that week. If one fails to satisfy his instructor as to his level of learning and understanding, he must sign up for a make up oral session held one evening each week and conducted by the senior instructor. He then has the opportunity to return to the Learning Center and work through any part or all of the minicourse(s) he did not satisfactorily complete. All minicourses are available for at least one week following the IQS in which they were scheduled.

Following the oral portion of the quiz session, and regardless of the results of the oral portion, students are asked to demonstrate a minimal level of learning on a written quiz on each of the minicourses scheduled for that week. Each minicourse has a level of mastery indicated on the first page of the quiz, which informs the student that he must correctly answer a particular number of the objective-type questions in order to satisfactorily complete the written quiz. The mastery level may indicate that he answer correctly 5 out of 5 questions, 12 out of 15, 7 out of 10, etc. Obviously, the number of test items is determined by the number of behavioral objectives for a given minicourse, and hence is related to the unit value of the minicourse. The level of mastery is arbitrarily determined by the instructors in the course as dictated by the specific questions they have written, but the average level of mastery approximates 70%.

Students record their answers on an IBM card and as soon as they finish, they take their card to the instructor's table and with the aid of a key, immediately determine for themselves whether they have achieved the level of mastery required for that minicourse. If they fail to satisfy the written quiz on any of the minicourses, they may appear at the evening make up session, or they may retake the quiz at their next regularly scheduled IQS.

2. When a student has satisfied the oral and written quizzes for all of the required minicourses for the course in which he is enrolled, he has earned a grade of "C." Any minicourses which were not required, and for which the oral and written were satisfied, are "banked" for credit during subsequent enrollment in the companion course.

3. Students may elect to earn an A or B by scoring enough "A and B" points. These points are achieved by reading Scientific American offprints and by taking one or all of three "A-B" exams during the semester. In Biology 109 a student can earn as many as 40 "A-B" points through reading the Scientific American offprints and writing summaries of his reading on a scheduled basis. He can further earn up to 120 points on three "40 point A-B" exams. There are, then, 160 "A-B" points available to him, and to earn a B he must obtain 50 points, to earn an A, 100 points.

The "A-B" type questions will require more from the student than rote memorization (which would probably suffice

for the "C" level of mastery). They will be designed to cause the student to synthesize, hypothesize, and apply concepts and principles learned from his ISS experience, and, therefore, to demonstrate clearly his "A-B" level of learning.

The Prognosis

It is too early in the program to have collected good evidence as to the success or failure of the concept or its implementation. It is not too early, however, for a prognosis. On paper, the program looks good, and in limited practice it promises success. There are problems associated with any flexible program - problems that have already been encountered and satisfactorily solved, and problems that have yet to be encountered and solved. There are anticipated problems which will yet arise, and many unanticipated problems which undoubtedly will arise. But the instructors have both a belief in the program and some practical indications that the problems can be met, and that the program, after refinement, can accomplish at least a significant portion of what they hope it will.

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